The interpersonal implications of PTSD and complex PTSD: The role of disturbances in self-organization

Bachem, Rahel ; Levin, Yafit ; Zerach, Gadi ; Cloitre, Marylène ; Solomon, Zahava

Abstract: BACKGROUND: In the aftermath of trauma not only the primary traumatized survivors' mental health is affected but often also their significant others. The current study explores the specific associations of ICD-11 symptoms of posttraumatic stress disorder (PTSD) and disturbances in self organization (DSO) for secondary traumatic stress and dyadic adjustment among both spouses. METHODS: Male Israeli veterans and their wives (N = 216) were assessed 30 years after the war. Primary PTSD/DSO symptoms of the veterans and secondary posttraumatic stress symptoms (secondary PTSS)/DSO of the wives were assessed. Actor Partner Independence Modelling (APIM) evaluated the differential effects of PTSD and DSO for trauma transmission and dyadic adjustment. RESULTS: While veterans' primary PTSD only related to secondary PTSS of the wives, the veterans' DSO predicted the wives' secondary PTSS as well as DSO. Moreover, the APIM revealed that the primary and secondary DSO of both partners were associated with dyadic adjustment while their PTSD symptoms were not. LIMITATIONS: The cross-sectional data did not allow to identify directional or causal effects and DSO symptoms were not assessed with an ICD-specific instrument as such scales did not exist at the time of data collection. CONCLUSIONS: ICD-11 DSO symptoms seem to drive the transmission of posttraumatic stress among spouses to a more significant extent than PTSD symptoms. As DSO are also strongly implicated in decreased dyadic adjustment, they are valuable targets for couple therapy after one spouse experienced severe trauma, both in order to prevent interpersonal trauma transfer as well as to enhance dyadic adjustment.

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Research paper

The interpersonal implications of PTSD and complex PTSD: The role of disturbances in self-organization

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ABSTRACT

Background: In the aftermath of trauma not only the primary traumatized survivors' mental health is affected but often also their significant others. The current study explores the specific associations of ICD-11 symptoms of posttraumatic stress disorder (PTSD) and disturbances in self organization (DSO) for secondary traumatic stress and dyadic adjustment among both spouses.
Methods: Male Israeli veterans and their wives ($N = 216$) were assessed 30 years after the war. Primary PTSD/DSO symptoms of the veterans and secondary posttraumatic stress symptoms (secondary PTSS)/DSO of the wives were assessed. Actor Partner Independence Modelling (APIM) evaluated the differential effects of PTSD and DSO for trauma transmission and dyadic adjustment.
Results: While veterans' primary PTSD only related to secondary PTSS of the wives, the veterans' DSO predicted the wives' secondary PTSS as well as DSO. Moreover, the APIM revealed that the primary and secondary DSO of both partners were associated with dyadic adjustment while their PTSD symptoms were not.
Limitations: The cross-sectional data did not allow to identify directional or causal effects and DSO symptoms were not assessed with an ICD-specific instrument as such scales did not exist at the time of data collection.
Conclusions: ICD-11 DSO symptoms seem to drive the transmission of posttraumatic stress among spouses to a more significant extent than PTSD symptoms. As DSO are also strongly implicated in decreased dyadic adjustment, they are valuable targets for couple therapy after one spouse experienced severe trauma, both in order to prevent interpersonal trauma transfer as well as to enhance dyadic adjustment.

The 11th revision of the World Health Organization's International Classification of Diseases (ICD-11; WHO, 2018) has introduced two sibling diagnoses: posttraumatic stress disorder (PTSD) and complex posttraumatic stress disorder (CPTSD). PTSD comprises three main symptom clusters representing re-experiencing the traumatic event in the present, avoidance of traumatic reminders, and a persistent sense of current threat that reflects various forms of arousal (WHO, 2018). Individuals suffering from CPTSD, experience not only all of the three symptom clusters of PTSD but also disturbances in self-organization (DSO), which are characterized by affective dysregulation (e.g. heightened emotional reactivity, anger outbursts, feeling emotionally numb or dissociated), a negative self-concept (e.g. feeling diminished, defeated or worthless; pervasive feelings of shame, guilt), and enduring disturbances in relationships (e.g., feeling distant from others, having difficulty maintaining intimate relationships; WHO, 2018).

Research has indicated that PTSD symptoms have negative effects on relationship quality and functioning among both those with PTSD and their spouses (Lambert et al., 2012). However, other posttraumatic symptoms and related behaviors such as anger, dissociation, distancing and poor self-regard may also contribute to problems in relationships (Monson et al., 2010). These symptoms are represented in the CPTSD symptom profile in the DSO cluster in CPTSD (e.g., affective dysregulation, negative self-concept). Our goal in this study was to assess the contribution of survivors' DSO to trauma-related distress of significant

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others and the relative contribution of PTSD and DSO symptoms to relationship difficulties among spouses. The CPTSD symptom profile and in particular the associated DSO symptoms may provide a conceptually coherent way to organize and explain the impact of trauma on a partner and on the quality and functioning of a relationship.

It is well-known that posttraumatic sequela is not confined to the primary trauma survivors but rather permeate the relationships with significant others (Dekel and Monson, 2010). Particularly close family members, such as survivors' spouses (e.g., Dekel et al., 2016; Renshaw et al., 2011) and children (e.g., Kalmijn, 2018; Lambert et al., 2014) may develop a wide range of emotional and psychiatric symptoms, a phenomenon which the literature has addressed under the term of secondary traumatic stress (Figley, 1995; Ludick and Figley, 2017). Secondary traumatic stress can either be understood as specific PTSD-like symptoms such as intrusive pictures of the family member's trauma (i.e. secondary posttraumatic stress symptoms; secondary PTSS), or more widely as a broad spectrum of symptoms related to anxiety, depression, or other psychopathology experienced by significant others after the primary survivor's trauma (Renshaw et al., 2011). It is assumed that secondary traumatic stress is rooted in close others' efforts to empathize and emotionally support their loved ones, whereby they may over-identify with spouses' trauma-related feelings (Figley, 1989; Rosenheck and Nathan, 1985).

Another important psychosocial domain that can be negatively affected in the aftermath of trauma is the quality of the dyadic relationship (i.e. the spouses' dyadic adjustment). Dyadic adjustment describes the degree of affection, satisfaction, consensus, and cohesion in a romantic relationship (Spanier, 1976). Numerous studies among trauma survivors have shown that higher levels of PTSD are associated with intimate relationship discord (see Taft et al., 2011, for a meta-analysis) and lower dyadic adjustment (see Lambert et al., 2012, for a meta-analysis). In addition, there is ample evidence that higher levels of PTSD among trauma survivors are tied to reports of decreased dyadic adjustment among their spouses, even when PTSD symptoms are subclinical (Campbell and Renshaw, 2013; Lambert et al., 2012; Zerach et al., 2015).

More specifically, previous research has focused on the differential effects of PTSD symptoms on relationship problems and the distress of significant others. For example, it was shown that higher levels of veterans' trauma-related avoidance and emotional numbing were associated with difficulties in intimacy and communication with their wives (Cook et al., 2004), which is likely due to the veterans' inability to experience and express emotions (Monson et al., 2009). Importantly, lower marital intimacy was also associated with more negative emotions among survivors' spouses (Mikulincer et al., 1995; Renshaw et al., 2010) as well as with marital distress (Renshaw et al., 2010). Furthermore, hyperarousal and constant alertness were found to correlate with elevated stress levels, irritability, anger outbursts, and aggression (Gillikin et al., 2016; O'Donnell et al., 2006; Orth and Wieland, 2006; Taft et al., 2007). Anger and aggression seem to mediate the relationship between PTSD-related symptoms of hyperarousal and relationship problems with intimate others (Evans et al., 2003; Solomon et al., 2008). In summary, the negative impact of PTSD on relationship functioning and the wellbeing of significant others is well-established but it has primarily been explained via mediating intrapersonal and interpersonal factors, such as loneliness, intimacy impairments, or heightened levels of aggression (Campbell and Renshaw, 2018).

However, the introduction of the new diagnosis of CPTSD now enables researchers to examine the interpersonal associations of trauma-related symptoms in a more differentiated manner as PTSD and DSO symptoms may be implicated in different domains of posttraumatic sequelae. Moreover, it enables to capture the full clinical symptom presentation of interpersonally traumatized populations such as former prisoners of war. In fact, we suggest that the recently defined DSO symptoms may be particularly potent in explaining the transmission of PTSD symptoms to family members as well as the interpersonal difficulties that posttraumatic sequelae often have among survivor families. For example, irritability and anger, which were found to be central factors regarding relationship functioning (Evans et al., 2003; Solomon et al., 2008), as detailed above, are essential components of the affect dysregulation symptom complex. Similarly, a lowered intra-psychic ability to maintain intimacy and closeness represents the content of the DSO cluster of interpersonal behavioral difficulties. Following this line of reasoning, the core features of CPTSD may be the very factors responsible for the deleterious toll that trauma can have on dyadic adjustment and secondary PTSS among spouses.

Given the relatively new introduction of the diagnosis of CPTSD, its interpersonal implications have not yet been explored in detail. In particular, the unique roles that DSO symptoms may have for interpersonal outcomes currently remain unexplored. To the best of our knowledge, only two studies examined the interpersonal consequences of CPTSD for relatives in survivor families. First, in a study with Tutsi genocide survivors, Shrira et al. (2019) found that offspring of parents with CPTSD reported more secondary PTSS and lower resilience than offspring of parents suffering from PTSD. Secondly, a study involving a mixed sample of patients with a clinical diagnosis of PTSD and healthy volunteers found that higher levels of CPTSD (as assessed by the Stress Reactions Checklist for Disorders of Extreme Stress; SRC; Ford et al., 2007), were associated with stronger relationship anxiety, relationship depression and fear of relationships among the survivors (Dorahy et al., 2013, 2017). Besides, several studies explored intrapersonal factors with social relevance among the survivors. For example, compared to those suffering from PTSD, those with CPTSD have been reported to have lower rates of adult secure attachment (Powers et al., 2017) as well as higher rates of anxious and avoidant attachment (Karatzias et al., 2018). An insecure attachment style is also known as one of the most established predictors of relationship difficulties and lowered dyadic adjustment in traumatized as well as non-traumatized populations (e.g., Li and Chan, 2012; Mikulincer and Shaver, 2016). However, the above-mentioned studies focused on the full symptom spectrum of CPTSD (i.e. PTSD and DSO symptoms) and not on the differential implications of the two hierarchical symptom complexes (i.e. PTSD vs. DSO symptoms).

In the light of the literature reviewed above, the current study aims to clarify the relative contributions of ICD-11 PTSD symptoms (re-experiencing, avoidance, sense of threat) and DSO symptoms (affective dysregulation, negative self-concept, disturbances in relationships) to secondary PTSS, DSO and dyadic adjustment in a sample of trauma-exposed combat veterans, some of whom were also prisoners of war, and their secondary exposed wives. Participation in combat is a traumatic experience often associated with intense helplessness, uncertainty, and dread. Additionally, war captivity is a traumatic experience that is deliberately perpetrated by one human to another, often including total domination of the perpetrator, profound humiliation, and exposure to various deliberate assaults, including torture (Stein et al., 2015). Combat and war captivity can have severe and adverse psychological consequences over the lifespan of a veteran (e.g., Horesh et al., 2013) and are associated with symptoms of CPTSD (Zerach et al., 2019). The current study expands this perspective and explores the systemic implications of such experiences. Capitalizing on the dyadic nature of this dataset, actor–partner interdependence modeling (APIM; Kenny et al., 2006) was employed for the analyses. We hypothesized that a) combat veterans' primary DSO symptoms more strongly contribute to their spouses' secondary PTSS and DSO than veterans' primary PTSD symptoms and b) that both spouses' DSO symptoms more strongly contribute to their dyadic adjustment than their respective primary PTSD or secondary PTSS.

Method

Participants and procedure

The current cross-sectional dyadic study is part of a multi-cohort longitudinal study of Israeli combat veterans from the 1973 Yom Kippur War and their spouses. Data in the overarching study were collected by administering questionnaires to the veterans and their wives, some of whom were former prisoners-of-war, at four time points after the war. Additional information regarding the study design and participants is provided for the veterans (Solomon et al., 2012) and their wives (Greene et al., 2014). In the assessment used in the current study (2003; 30 years after the Yom-Kippur war), 216 couples participated. This study was supported by the I-CORE, Program of the Planning and Budgeting Committee, and The Israel Science Foundation (grant #1916/12). Upon receiving both the Tel Aviv University and Israel Defense Force ethics committee's approval (#121,541), we contacted the veterans and their spouses and obtained written informed consent. The questionnaires were administered at the participants' homes or another location of their choice.

Demographics. The age of the veterans was $M = 52.59$, $SD = 4.63$ years. On average, they obtained $M = 13.9$, $SD = 3.9$ years of education. At the time of assessment, 57.2% were working in full-time jobs, 13.3% had part-time jobs, and 29.5% were not working. Spouses were aged $M = 49.55$, $SD = 5.89$ years. They attended $M = 14.6$, $SD = 3.17$ years of education. At the time of assessment, 47.7% of the wives were working in full-time jobs, 20.9% had part-time jobs, and 31.4% were not working. The couples were all married, for a duration of $M = 32.20$, $SD = 9.08$ years, and had an average number of children of $M = 3.23$, $SD = 3.00$.

Measures

Two measures were used to assess the PTSD and DSO symptoms: the PTSD Inventory (PTSD-I; Solomon et al., 1993) and the Brief Symptom Inventory (BSI; Derogatis and Spencer, 1982).

PTSD Inventory (PTSD-I; Solomon et al., 1993). This widely used and well-validated 17-item self-report questionnaire represents the three symptom clusters of intrusions, hyperarousal, and avoidance specified in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Revised (DSM-IV-TR; American Psychiatric Association, 1994), which represented the standard of practice when the study commenced. Participants were asked to rate how often they suffered from each symptom in the previous month on a scale ranging from 0 (not at all) to 4 (almost *always*). Importantly, to assess wives' secondary PTSS, the wives rated symptoms referring to their husbands' war trauma (veterans' example item: "you tried to avoid thoughts or feelings about the war", wives' example item: "you tried to avoid thoughts or feelings about your husband's experience in war"). Following the suggestions of Zerach et al. (2019), two items from the PTSD-1 were chosen to represent each symptom cluster of the ICD-11 concept of PTSD. The items that were selected are presented in Table 1.

Brief Symptom Inventory (BSI; Derogatis and Spencer, 1982). The BSI is a 53-item self-report psychological symptom inventory with nine primary symptom dimensions (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism). The measure assesses how much a problem bothered or distressed a person using a 5-point Likert scale ranging from 0 "not at all'' to 4 "extremely''. In the absence of validated self-report measures for DSO symptoms according to the ICD-11 definitions at the time the study was conducted, two BSI items were used to approximate each symptom cluster of the DSO construct. These items were selected based on face validity and following other studies of ICD-11 CPTSD (e.g., Cloitre et al., 2013), from the BSI. As the ICD-11 does not phrase DSO symptoms to be event-specific, questions among the wives were not anchored to relate to the husbands' war trauma. The items were previously employed by Zerach et al. (2019) and are shown in Table 1.

Table 1
Items representing PTSD and CPTSD.

	Symptom cluster	Questionnaire item	
PTSD	Re-Experiencing	PTSD-I no. 2.	Recurrent nightmares about captivity
		PTSD-I no. 3.	Feeling as though the event is happening again
	Avoidance	PTSD-I no.5.	Avoiding thoughts and feelings associated with captivity
		PTSD-I no.6	Avoiding activities that remind you captivity
	Sense of Threat	PTSD-I no. 16	Hypervigilance or feeling on guard
		PTSD-I no. 17	Jumpy or easily startled
DSO	Affect Dysregulation	BSI no.13.	Temper outbursts
		BSI no.20.	Your feelings being easily hurt
	Negative Self-Concept	BSI no.50.	Feelings of worthlessness
		BSI no.52.	Feelings of guilt
	Interpersonal Problems	BSI no.44.	Never feeling close to another person
		BSI no.14.	Feeling lonely even when you are with people

Dyadic Adjustment Scale (DAS; Spanier, 1976). The DAS is a 32-item measure of marital quality. The 32-items of the DAS are measured on varying Likert-type response scales and are summed to create a total score ranging from 0 to 151. Higher scores suggest better dyadic adjustment. Veterans and wives were asked to indicate the extent to which each item described their current marital interaction, for example: "Do you engage in outside interests together?" The scale has high convergent and discriminant validity (Heyman et al., 1994) and has been used in international as well as Israeli populations (Horesh and Fennig, 2000). In the current study, internal consistency was high among both husbands and wives (Cronbach's $\alpha = 0.95, 0.96$, respectively).

Handling missing data

The data included missing values (22.2% in veterans and 15% in wives). Little's (1988) Missing Completely at Random test (MCAR) was used to examine potential bias due to missing values and revealed that the data were missing completely at random, $\chi^2(101) = 156.05$, $p < .001$. Missing data were replaced with maximum likelihood (ML) when running models in AMOS 25 (Abruckle, 2006). This method uses all available data for each participant to recover missing information between spouses. This dyadic study used data measured across partners to increase the likelihood for optimal estimations (Collins, Schafer, & Kam, 2001).

Data analysis

Data were analyzed using IBM SPSS Statistics version 25 (SPSS, 2013). In the first step, we conducted matched comparisons between veterans and wives in PTSD and DSO clusters, and marital adjustment, using paired samples t-tests. Second, bivariate Pearson correlations were computed for all study variables. Then, research hypotheses were tested using an actor–partner interdependence model (APIM; Kenny et al., 2006) based on structural equation modeling (SEM) using AMOS 25 (Arbuckle, 2014). In APIM, the unit of analysis is a pair of individuals.

This method allows for the examination of whether one individual's outcome is predicted by his or her own attributes, and/or those of a partner. These effects are referred to as actor effects (intrapersonal effects) and partner effects (interpersonal effects), respectively.

As preliminary steps, we conducted tests of metric invariance (Kenny and Ledermann, 2010) and power in the APIM analysis using a web-based power calculator (Ackerman et al., 2016). Then we tested the measurement model, in which the latent factors of PTSD and DSO were examined, as well as correlations between all factors, on the intrapersonal level and the interpersonal level between spouses. Finally, we estimated two APIM models (Kenny et al., 2006). We first estimated the associations between veterans and their wives' PTSD and DSO symptoms. In the second model, we included marital adjustment and examined the associations between PTSD and DSO of the veterans and their wives on the one hand, and both spouses' marital adjustment on the other hand.

SEM was used to estimate the parameters in this APIM, using AMOS 25. A model is judged as fitting well if the comparative fit index (CFI), normed-fit index (NFI), and the Tucker–Lewis index (TLI) are greater than 0.9. The root-mean-square error of approximation (RMSEA) is considered mediocre fit if lower than 0.1, acceptable-reasonable fit if below 0.08 (Garver and Mentzer, 1999; Hoe, 2008), and 0.06 is considered excellent fit (Hu and Bentler, 1999). A chi-square test was computed but due to its sensitivity to sample size, we used the ratio of chi-square to degrees of freedom. Values between 1 and 5 indicate a satisfactory fit between the theoretical model and empirical data.

Results

Participant characteristics

Matched comparisons of the main study variables are presented in Table 2. Veterans reported significantly higher levels of PTSD symptoms (re-experiencing, avoidance, and sense of threat) as well as DSO symptoms (affective dysregulation, negative self-concept, disturbances in relationships) compared to their wives. However, the analyses revealed similar levels of marital adjustment among veterans and their wives. Correlations among variables are presented in Table 3. Notably, the marital adjustment of both spouses was intrapersonally and interpersonally correlated with their PTSD/PTSS and primary and secondary DSO symptoms.

Actor–Partner interdependence model analysis

To test the main research hypotheses, APIMs were estimated for PTSD and DSO symptoms of both spouses (see Fig. 1) and for PTSD and DSO symptoms and their associations to both spouses' marital adjustment (see Fig. 2). We calculated the power in the APIM analysis using the web-based power calculator (Ackerman et al., 2016). For this purpose, we corrected our sample size according to the number of pairs of actor and partner effects. The power detected ranged between 0.82 to 0.89 values which are sufficient to detect actor and partner effects.

First, to ensure that PTSD and DSO symptoms and marital adjustment were each operationalized equivalently between veterans and their wives, tests of metric invariance were conducted (Kenny and Ledermann, 2010). These measures were found to be fully metrically invariant between spouses. Control variables that were nonsignificant for either partner were removed from the final models (i.e., education and age). The measurement model had a reasonable-acceptable fit to the data, $\chi^2(45) = 99.49$, $p < .001$, $\chi^2/df = 2.21$, CFI = 0.95, NFI = 0.95, TLI = 0.90, RMSEA = 0.07 (CI 90% 0.05, 0.08). All intrapersonal and interpersonal effects in the model were significant. The theoretical model that examined the associations between spouses' PTSD and DSO resulted in reasonable-acceptable model fit $\chi^2(34) = 75.61$, $p < .001$, $\chi^2/df = 2.22$, CFI = 0.97, NFI = 0.97, TLI = 0.95, RMSEA = 0.07 (CI 90% 0.05, 0.08). In this model, we found that the veterans' higher primary PTSD symptoms were associated with the wives' higher secondary PTSS symptoms. Similarly, the veterans' primary DSO symptoms were associated with their wives' secondary DSO symptoms. As for the cross effects between PTSD and DSO, it was revealed that the veterans' primary DSO symptoms were associated with their wives' secondary PTSS, but the veterans' primary PTSD symptoms were not associated with their wives' secondary DSO symptoms.

The second APIM model that aimed to estimate the associations between spouses' PTSD and DSO on the one hand, and marital adjustment, on the other hand, resulted in a mediocre model fit $\chi^2(47) = 133.63$, $p < .001$, $\chi^2/df = 2.84$, CFI = 0.95, NFI = 0.93, TLI = 0.90, RMSEA = 0.09 (CI 90% 0.07, 0.11). In the model, the same actor effects remained between spouses' PTSD and DSO, and the same partner effect between the veterans' primary DSO and their wives' secondary PTSS. Interestingly, it was revealed that the veterans' higher levels of DSO symptoms, but not their PTSD, were associated with lower marital adjustment. Likewise, the wives' higher secondary DSO symptoms, but not their secondary PTSS, were associated with their own lower marital adjustment. No partner effects were revealed between the primary and secondary PTSD/DSO symptoms of one of the spouses and the other's marital adjustment. We also found one significant indirect effect between the veterans' DSO symptoms and the wives' marital adjustment, showing that higher DSO symptoms in the veterans were associated with wives' higher secondary PTSS symptoms which were related to wives' lower marital adjustment (unstandardized $b = -2.495$ se = 1.54 CI 95% −6.830, −0.843). Other indirect effects included 0 and therefore were not significant.

Table 2
Sample Description and Difference Testing.

	Veterans	Wives	T (215)	*p*
Re-Experiencing	4.23 (1.83)	2.93 (1.19)	10.74***	$p<.000$
Avoidance	4.15 (1.89)	3.21 (0.49)	7.09***	$p<.000$
Sense of Threat	5.24 (1.91)	4.81 (1.57)	2.91**	$p=.008$
Affect Dysregulation	2.58 (2.23)	1.73 (1.61)	5.69***	$p<.000$
Negative Self-Concept	1.66 (1.86)	.91 (1.25)	5.80***	$p<.000$
Interpersonal Difficulties	2.22 (2.09)	.87 (1.13)	10.12***	$p<.000$
Marital Adjustment	105.74 (19.91)	105.87 (21.34)	−0.10	$p=.920$

Discussion

In this study, we aimed to examine the relative contributions of combat veterans' PTSD symptoms (re-experiencing, avoidance, sense of threat) and DSO symptoms (affective dysregulation, negative self-concept, decreased relational capacities) to their spouses' secondary PTSS/DSO and both partners' dyadic adjustment. Overall, the data supported the idea that DSO symptoms play a more significant role in the interpersonal post-traumatic context compared to PTSD symptoms. They also shed light on the prominent role DSO play in a dyadic relationship.

Within the current study, two processes of transmission of trauma were identified, from primary PTSD of the veterans to secondary PTSS of the wives, as well as from primary DSO of the veterans to secondary PTSS of the wives. While the primary traumatized veterans' PTSD symptoms only related to wives' secondary PTSS, veterans' DSO symptoms related to both their wives' secondary PTSS as well as DSO symptoms. Thus, it seems that DSO have a broader impact on spouses' mental health than PTSD symptoms. It is also particularly noteworthy that husbands' DSO symptoms explained additional variance in secondary PTSS, above and beyond the contribution of their primary PTSD. This finding suggests that the primary survivors' DSO are associated with a heightened vulnerability for secondary PTSS among their spouses. The unique contribution of each of the pathways adds support to earlier findings showing that PTSD and DSO symptoms are separate but

Table 3
Intercorrelation Matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Veterans' Marital Adjustment	–													
2.Wives' Marital Adjustment	.52***	–												
3.Veterans' Re-Experiencing	−0.36***	−0.35***	–											
4.Wives' Re-Experiencing	−0.22*	−0.25**	.37***	–										
5.Veterans' Avoidance	−0.34***	−0.15*	.77***	.33***	–									
6.Wives' Avoidance	−0.13	−0.15*	.42***	.71***	.34***	–								
7.Veterans' Threat Sense	−0.33***	−0.20*	.65***	.30***	.73***	.28***	–							
8.Wives' Threat Sense	−0.32***	−0.29***	.30***	.49***	.35***	.50***	.25**	–						
9.Veterans' Negative Affect	−0.46***	−0.27***	.62***	.33***	.66***	.29***	.67***	.36***	–					
10.Wives' Negative Affect	−0.17*	−0.25***	.34***	.37***	.23**	.35***	.16*	.46***	.39***	–				
11.Veterans' Self-Concept	−0.58***	−0.31***	.47***	.32***	.42***	.26**	.46***	.32***	.65***	.38***	–			
12.Wives' Self-Concept	−0.19**	−0.31***	.23**	.30***	.21*	.34***	.13*	.39***	.27***	.62***	.31***	–		
13.Veterans' Interpersonal Difficulties	−0.58***	−0.46***	.54***	.32***	.53***	.30***	.56***	.34***	.66***	.26**	.78***	.25**	–	
14.Wives' Interpersonal Difficulties	−0.37***	−0.45***	.34***	.39***	.29***	.28***	.18*	.38***	.38***	.62***	.47***	.59***	.38***	–

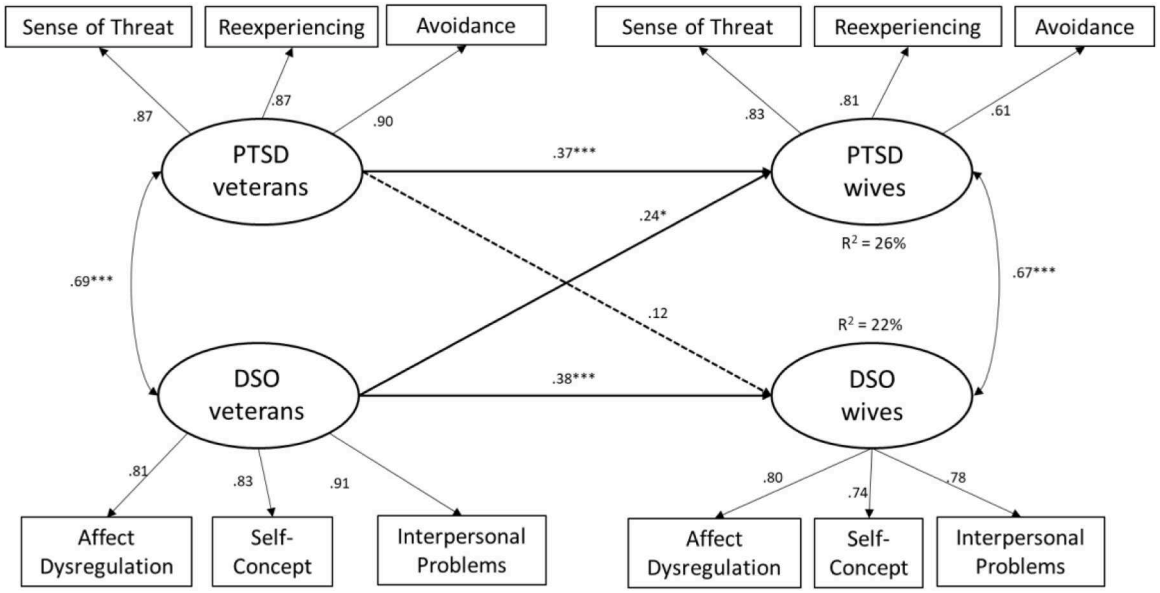

Fig. 1. Actor–partner interdependence models for PTSD and DSO symptoms of veterans and wives. Standardized coefficients. All factor loadings significant at $p < 0.001$; *$p < 05$, ***$p < .001$.

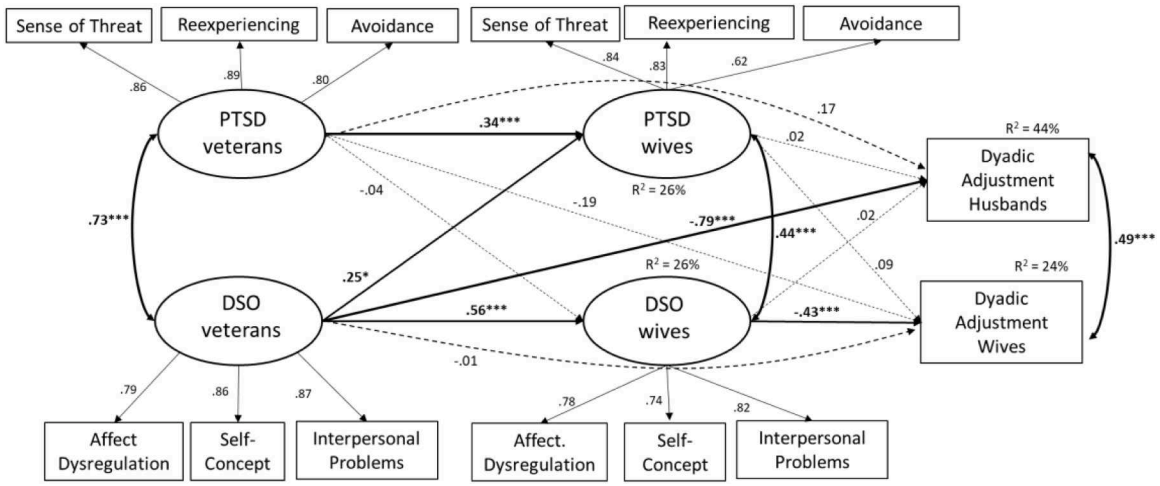

Fig. 2. Actor–partner interdependence models for PTSD and DSO symptoms of veterans and wives, and their Marital Adjustment. Standardized coefficients. All factor loadings significant at $p < .001$; *$p < 05$, **$p < .01$, ***$p < .001$.

related constructs (Knefel et al., 2019, 2020) and expands the solid body of literature that found transmission of PTSD symptoms between spouses (e.g., Dekel et al., 2016; Renshaw et al., 2011), adding new insight into the key factors related to trauma transmission.

Relatives living with a person suffering from CPTSD often manage highly demanding interpersonal spheres, characterized on the part of the survivor by reduced distress tolerance, outbursts of anger, an inability to show affection, excessive demands, and self-destructive behaviors which take a heavy toll on the organization of daily routine (Hyland et al., 2017; Stadtmann et al., 2018). Qualitative research further illustrated that relatives of patients suffering from CPTSD live in constant worry that the affected person may be in danger of an acute crisis or relapse (Stadtmann et al., 2018). Moreover, there is a growing body of evidence on caregiver burden that highlight the difficulties and needs of relatives providing care to their ill loved ones, which can include feelings of isolation, anxiety, anger, and frustration (e.g., Shamsaei et al., 2015; Vitaliano et al., 2003). As CPTSD is a severe and chronic disorder, affecting more domains of self-organization than PTSD, a heightened vulnerability for secondary PTSS and DSO among spouses seems plausible. However, none of the above studies focused on the differential effects of PTSD and DSO symptoms, and future research is needed to further clarify the differential effects of primary PTSD and DSO for relatives' psychological adjustment.

The current findings further illustrate that the nature of distress among trauma survivors' spouses can manifest as both PTSD-like symptoms with an explicit reference to the veterans' war trauma (e.g. "you tried to avoid thoughts or feelings about your husband's experience in war") as well as DSO symptoms that are less specific to the traumatic experience but rather represent general tendencies to react in situations (e.g., feelings of guilt, emotional sensitivity). It has been suggested that among trauma survivors' spouses such broader symptoms may represent general psychological distress related to the challenges of living with a partner who suffers from PTSD (Renshaw et al., 2011). The current results, however, suggest that they may at least partially correspond to the clinical picture of CPTSD. Future research is needed that uses instruments specifically designed to assess DSO symptoms (i.e. the International Trauma Questionnaire; ITQ; Cloitre et al., 2018) to advance knowledge on the precise nature of spouses' distress. Given that trauma survivors' spouses are a vulnerable population with heightened psychopathology, understanding their stress response is of crucial importance to improve psychosocial support systems.

Within the scope of the second research question, it was found that both the veterans' and their wives' DSO symptoms predicted their own dyadic adjustment. Neither the veterans' primary PTSD symptoms nor the wives' secondary PTSS symptoms explained variance in dyadic adjustment above and beyond DSO. This finding may surprise, given the myriad of studies that have illustrated the debilitating association of PTSD symptoms on spouses' dyadic adjustment (Campbell and Renshaw, 2018; Lambert et al., 2012). Even though previous research has shown that complex PTSD has significant consequences for intimate relationships (Dorahy et al., 2013), this was the first study that attempted to disentangle the differential effect of PTSD symptoms and DSO symptoms for interpersonal relationships. The results show that DSO not only further the development of secondary PTSS among spouses but rather directly adversely relate to the relationships themselves.

In fact, disturbances in relationships, such as feeling distant from others, are part of the DSO symptom spectrum and their contribution to relationship difficulties has face validity. Besides, a negative self-concept often entails negative social emotions, such as shame and guilt (Ford et al., 2006), which can impair social functioning and have been associated with distress in interpersonal relationships in traumatized individuals (Dorahy et al., 2013, 2017). Finally, affective dysregulation, including emotional outbursts, an inability to calm down, or emotional numbness have long been known to be negatively associated with interpersonal conflicts (Campbell and Renshaw, 2013; Solomon et al., 2008). Impaired social functioning and interpersonal conflict, in turn, are directly linked with lowered dyadic adjustment. It is noteworthy that the effect of PTSD symptoms does not explain any additional variance in dyadic adjustment.

In their review of the topic, Campbell and Renshaw (2018) note that some findings in the literature suggest that non-specific symptoms, such as depression or anger, seem to account for more variance in relationship impairments than trauma-specific PTSD symptoms. The current results suggest that, potentially, DSO symptoms may account for this phenomenon. The current findings extend these conclusions by suggesting that the clinical picture of DSO symptoms may be the posttraumatic sequelae that determine the interpersonal climate in trauma survivor families. Indeed, as higher levels of PTSD symptoms likely align with higher levels of DSO symptoms, we propose that DSO have always been a third variable in the studies assessing the effect of posttraumatic sequelae on relationships. They may in fact be considered the "elephant in the room" in studies on the interpersonal implications of posttraumatic stress after severe and prolonged mand-made trauma.

Several study limitations should be acknowledged. First, the nature of our cross-sectional data did not allow us to identify directional effects or causation between symptom groups and relationship issues. Second, the use of self-report data rendered an assessment that may have been affected by a reporting bias. Additionally, a considerable number of missing data had to be imputed, which represent estimates rather than accurate measures. Third, DSO symptoms have not been assessed with an instrument designed for capturing the ICD-11 concept as the concept itself as well as the standard instrument, the ITQ (Cloitre et al., 2018) had not been developed at the time of this study. However, the current approach of approximating DSO symptoms by using items of the BSI-53 was successfully used previously (e.g., Zerach et al., 2019). Despite these limitations, it should be emphasized that the dyadic nature of our data and the APIM methodology enable a unique contribution of this study.

Despite its limitations, the current study has several clinical implications. DSO symptoms seem to play a more crucial role in the transmission of posttraumatic stress among spouses than PTSD symptoms. It follows that interventions for couples where one spouse experienced severe trauma should aim at preventing interpersonal trauma transfer. In particular, they should explore potential symptoms of DSO among the trauma survivors as these seem particularly malevolent with regard to secondary traumatic stress in the spouse as well as with regard to the relational atmosphere in the couple. Addressing the DSO of the survivor may prevent trauma transfer and strengthen survivors' families. Moreover, given further replication of the current results, couple therapy in the aftermath of trauma should focus on alleviating DSO symptoms rather than PTSD symptoms among both spouses to enhance dyadic adjustment. Nevertheless, the findings do not suggest that addressing PTSD symptoms is unnecessary when addressing relationship difficulties in the post-trauma context. PTSD symptoms cause significant individual suffering and functional impairment, which have a negative impact on dyadic adjustment in their own right. Future studies should widen the perspective to include multiple family relationships, such as intergenerational trauma transfer and parent-child relationships, in the study of DSO and its interpersonal effects.

Author contributions

RB: Contributed to the conceptualization and design of the study, drafted the manuscript.

YL: Contributed to the conceptualization and the design of the study, conducted the data analysis and reporting, conducted a critical review of the manuscript.

GZ: Contributed to the conceptualization and the design of the study and conducted a critical review of the manuscript.

MC: Contributed to the conceptualization and the design of the study and conducted a critical review of the manuscript.

ZS: Contributed to the conceptualization and the design of the study, collected the data and conducted a critical review of the manuscript.

All authors contributed to the article and approved the submitted version.

Declaration of Competing Interests

None of the authors has declarations.

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